Name _____ Date _____ Class _____

Enrich

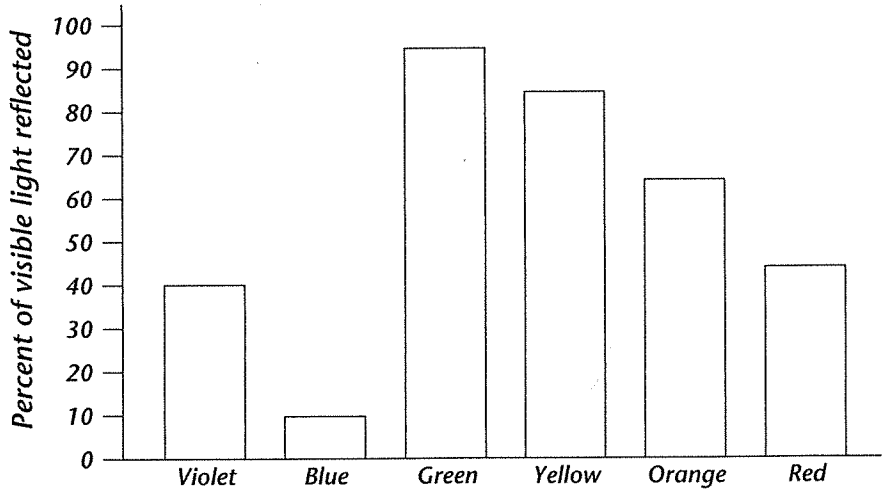
Photosynthesis

Read the passage and study the bar graph. Then answer the questions that follow on a separate sheet of paper.

Chlorophyll and the Color of Light

A pigment is a colored chemical compound that absorbs light. You can think of a pigment as a kind of sponge that absorbs light of all colors except the ones that it transmits and reflects. The colors that you see are the colors of light that the pigment reflects. The bar graph below shows the percentages of light of different colors that are reflected by the plant pigment chlorophyll.

Percent of Visible Light Reflected by Chlorophyll



1. Which color of light does chlorophyll reflect most? About what percent of light of this color does chlorophyll reflect?
2. Which color of light does chlorophyll absorb most? About what percent of light of this color does chlorophyll absorb?
3. The colors that are reflected less than 50% contribute very little to what the eye sees. Which colors does your eye respond to when you look at a "green" leaf?
4. Which colors of light do you not see when you look at a "green" leaf?
5. Explain in your own words how chlorophyll makes a leaf look green.

Place the outside corner, the corner away from the dotted line, in the corner of your copy machine to copy onto letter-size paper.

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Cellular Respiration

Read the passage. Then answer the questions that follow on a separate sheet of paper.

History of Fermentation

In 1854, the French chemist Louis Pasteur determined that fermentation is caused by yeast. His work was influenced by the earlier work of Theodor Schwann, the German scientist who helped develop the cell theory. Around 1840, Schwann concluded that fermentation is the result of processes that occur in living things. In 1907, a German chemist named Eduard Buchner received the Nobel prize for showing that enzymes in yeast cells cause fermentation. About two decades later, two other scientists determined exactly how enzymes cause fermentation. Their names are Arthur Harden and Hans Euler-Chelpin, and they won the Nobel prize for their work in 1929. By the 1940s, technology was developed to use fermentation to produce antibiotics.

Fermentation is a very useful process. Today it is used to produce industrial chemicals, medicines such as antibiotics, and alcoholic beverages, as well as to make bread rise and to preserve many types of food. Some of these uses have been known for thousands of years. For example, the Chinese used fermented soybean curd to treat skin infections 3,000 years ago, and they started using fermented tea to treat a variety of illnesses as early as 220 B.C. The use of fermentation to make bread rise and to produce alcoholic beverages is as old as the development of agriculture itself, which most scholars date to about 8000 B.C.

1. Use the information provided in the passage above to make a timeline of the history of fermentation.
2. What contribution did Louis Pasteur make to the understanding of the process of fermentation?
3. What are two of the oldest uses of fermentation?
4. How is fermentation used in medicine today?

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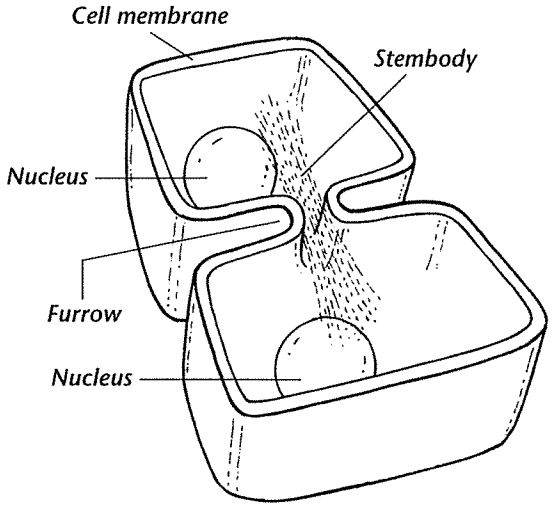
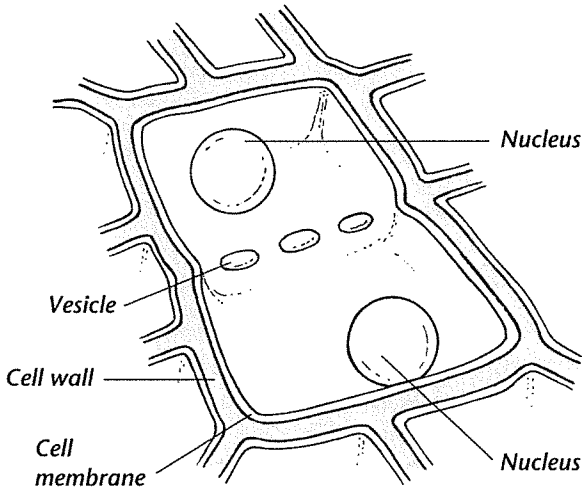
Cell Division

Read the passage and study the figures below. Then answer the questions that follow on a separate sheet of paper.

Recall that all plant cells have a rigid wall. Because of this rigid cell wall, cytokinesis in plant cells is different from cytokinesis in animal cells. Study the figures below to see how cytokinesis differs in plant cells and animal cells.



Animal cell



Plant cell

In animal cells, as daughter cells pinch into two cells, there is a space between the cells called a furrow. As the furrow gets increasingly narrower, the spindle fibers are pressed into a tight bundle, called a stembody. The stembody eventually is cut in two as the new cell membranes fuse together.

In plant cells, pockets of cell-wall material, called vesicles, line up across the middle of the cell. The vesicles fuse together in two sheets to form new cell walls and cell membranes between the daughter cells.

1. How does the furrow form in an animal cell? What's the furrow's role in cell division?
2. What causes the stembody to form in an animal cell? What happens to the stembody when the cell divides?
3. What are vesicles? Which parts of the plant cell do vesicles develop into?
4. If you observed a cell under a microscope during cytokinesis, how could you tell whether it was a plant cell or an animal cell?

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